SPECIFICATION

[ ] Preliminary Specification
[◉] Final Specification

Description **4.3” 480(RGB)x272 TFT-LCD Module**

Part Number **P0430WQF1ME00DK00**

Customer		Industrial Product Dept, PDBU Tianma Microelectronics Co., Ltd.	
Signatures	Date	Approved By	Date
		Kevin	2025/10/17
		Reviewed By	
		Longping.Deng	2025/10/17
		Prepared By	
		Lixian.Xu	2025/10/17
Comments:			

* This cover page is for your Comments and Signatures back to TIANMA.

REVISION HISTORY

Rev	Date	Page	Revision Items	Editor
1.0	2024/9/26	-	Preliminary SPEC released.	Lixian.Xu
2.0	2025/10/17	-	Final SPEC released.	Lixian.Xu

CONTENTS

1. Features

1.1 General Description

This is a 4.3 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) Normally Black technology module, which is composed of a TFT-LCD panel, LCD Driver IC, FPC, a LED backlight and CTP unit.

1.2 Features

- Ultra-wide viewing angle (88/88/88/88)
- Interface: RGB

- Acquisition product for UL62368-1/CSA C22.2 No.62368-1-03 (File number: E170632)
- Compliant with the European RoHS Directive (2011/65/EU) and Delegated Directive (2015/863/EU, Amending Annex II of 2011/65/EU)

2. General Specifications

Feature		Spec	Unit
Display Spec	Size	4.3 inch	
	Resolution	480(RGB) ×272	
	Pixel Pitch	0.198×0.198	mm
	Technology Type	a-Si	
	Pixel Configuration	R.G.B Vertical Stripe	
	Display Mode	Normally Black ， SFT technology	
	Surface Treatment	AG	
	Viewing Direction	All	
	Gray Scale Inversion Direction	No gray inversion.	
Mechanical Characteristics	LCM (W x H x D)	LCM：105.50×67.20×2.9	mm
		CTP+LCM：113.44×71.46×4.68	mm
	Active Area (W x H)	TFT LCD：95.040×53.856	mm
		CTP：97.04×55.86	mm
	Weight	70	g
	With/Without CTP	With CTP	
	CTP Touch Method	Bare finger	
	Number of simultaneous touches	5	
	Minimum Touch Area	Φ7	mm
	Finger Touch Pitch	≥13	mm
	CTP Structure	GG	
Optical Characteristics	Viewing Angle	88/88/88/88(typ)	degree
	Contrast Ratio	800(typ)	
	NTSC	50(typ)	%
	Luminance	350(typ)	cd/m2
Electrical Characteristics	Interface	RGB 24bits	
	Color Depth	16.7 Million	color
	Power Consumption	CTP:53 LCD: 95 Backlight：600	mW

Table 2.1 General TFT Specifications

Note 1: The height dimension does not include the length of FPC.
Note 2: LCM weight tolerance: ±5%.

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Connector Information	
Connector type	0.5mm pitch FPC
Matching connector	FH19SC-40S-0.5SH(HIROSE) or equivalent

Table 3.1.1 Connector information

Pin No.	Symbol	I/O	Function	Remark
1	VLED-	P	Back light cathode	
2	VLED+	P	Back light anode	
3	GND	P	Ground	
4	VDD	P	Power supply +3.3V	
5	R0	I	Red Data input	
6	R1	I	Red Data input	
7	R2	I	Red Data input	
8	R3	I	Red Data input	
9	R4	I	Red Data input	
10	R5	I	Red Data input	
11	R6	I	Red Data input	
12	R7	I	Red Data input	
13	G0	I	Green Data input	
14	G1	I	Green Data input	
15	G2	I	Green Data input	
16	G3	I	Green Data input	
17	G4	I	Green Data input	
18	G5	I	Green Data input	
19	G6	I	Green Data input	
20	G7	I	Green Data input	
21	B0	I	Blue Data input	
22	B1	I	Blue Data input	
23	B2	I	Blue Data input	
24	B3	I	Blue Data input	
25	B4	I	Blue Data input	
26	B5	I	Blue Data input	
27	B6	I	Blue Data input	
28	B7	I	Blue Data input	
29	GND	P	Ground	
30	DCLK	I	Clock signal, latch data at falling edge	
31	DISP	I	Display control/standby mode selection, Internal pull low DISP=”Low”: Standby; DISP=”High”: Normal display	
32	HSYNC	I	Horizontal sync signal, low active	
33	VSYNC	I	Vertical sync signal, low active	
34	DE	I	Data input enable. Active High to enable the data input	
35	NC(EXTC)	N	No connection. OTP trim function control. Please keep this pin in floating.	
36	GND	P	Ground	
37	NC(CS)	N	No connection.	

			Serial communication chip select, Please keep this pin in floating.	
38	NC(SCL)	N	No connection. Serial communication clock input, Please keep this pin in floating.	
39	NC(SDA)	N	No connection. Serial communication data input and output, Please keep this pin in floating.	
40	NC(VPP)	N	No connection. For OTP, Please keep this pin in floating.	

Table 3.1.2 Pin Assignment for LCD Interface

Note1: I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection
Note2: All of the GND pins should be connected to the system ground.
Note3: Description of Scan Direction.

3.2 CN2 Pin assignment (CTP Interface)

Connector Information	
Connector type	0.5mm pitch FPC
Matching connector	FH12-10S-0.5SH or equivalent

Table 3.2.1 Connector information

Pin No.	Symbol	I/O	Function	Remark
1	GND	P	Ground	
2	RESET	I	System reset signal input, active low	
3	VCC	P	CTP power supply	
4	INT	O	Indicate coordinate data ready	
5	SCL	I	I2C serial clock	
6	SDA	I/O	I2C serial data	
7	NC	-	No connection	
8	NC	-	No connection	
9	NC	-	No connection	
10	NC	-	No connection	

Table 3.2.2 Pin Assignment for CTP Interface

Note1: I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection

4. Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage for TFT	VDD	-0.3	4.0	V	Note1
IO Supply Voltage for TFT	VDDI	-0.3	4.0	V	Note1
Logic Input Voltage Range for TFT	VIN	-0.3	VDDI+0.3	V	Note1，Note3
Logic Output Voltage Range for TFT	VO	-0.3	VDDI+0.3	V	Note1
Power Voltage for CTP	VCC	-0.3	6.0	V	Note1
IO Input Or Output Voltage for CTP	IOCTP	-0.3	6.0	V	Note1，Note4
Operating Temperature	Top	-20	70	℃	Note2
Storage Temperature	Tst	-30	80	℃	Note2
Relative Humidity Note2	RH	--	≤95	%	Ta≤40℃
		--	≤85	%	40℃＜Ta≤50℃
		--	≤55	%	50℃＜Ta≤60℃
		--	≤36	%	60℃＜Ta≤70℃
		--	≤24	%	70℃＜Ta≤80℃
Absolute Humidity	AH	--	≤70	g/m³	Ta＞70℃

Table 4.1 Absolute Maximum Ratings

Note1: Ta means the ambient temperature. It is necessary to limit the relative humidity to the specified temperature range. Condensation on the module is not allowed.

Note2: The absolute maximum rating values of this product are not allowed to be exceeded at any times. A module should be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme condition, the module may be permanently damaged.

Note3: R[7:0]; G[7:0]; B[7:0]; DCLK; DISP; HSYNC; VSYNC;DE.

Note4: RESET, INT, SCL, SDA.

5. Electrical Characteristics

5.1 Driving TFT LCD Panel

GND=0V, Ta = 25℃

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		VDD	3.2	3.3	3.4	V	Note1
Supply current		IVDD	-	28.8	-	mA	Note1
VDD power consumption		WVDD	-	95	-	mW	Note1
Input Signal Voltage	Low Level	VIL	GND	—	0.3×VDD	V	Note2
	High Level	VIH	0.7×VDD	—	VDD	V	Note2

Table 5.1.1 Operating Voltages

Note1: To test the current dissipation, using the “white “testing pattern. The proposed supply voltage is 3.3±0.1V, the typical voltage 3.3V is applied in the test in Chapter 6 and Chapter 7.
Note2: R[7:0]; G[7:0]; B[7:0]; DCLK; DISP; HSYNC; VSYNC;DE.

5.2 DC Characteristics for CTP

VCC=3.3V, Ta = 25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Power supply voltage	VCC	3.2	3.3	3.4	V	
Input High Voltage	VIHctp	0.85*VCC	-	VCC	V	Note1
Input Low Voltage	VILctp	0	-	0.15*VCC	V	Note1
Output High Voltage	VOHctp	0.8*VCC	-	-	V	Note1
Output Low Voltage	VOLctp	-	-	0.2*VCC	V	Note1
Operating Current	I_{NML}	-	16.1	24	mA	Note 2
Idle Current	I_{IDLE}	-	8.1	12.2	mA	
Power Down Current	I_{PD}	-	-	20	uA	

Table 5.3.1 LED Backlight Characteristics

Note1: RESET, INT, SCL, SDA.
Note2: All current measurement is average current at Operating mode.

5.3 DC Characteristics for Backlight Driving

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	--	40	--	mA	10 LEDs (5LED Serial,2 LED Parallel)
Forward Current Voltage	VF	13.5	15	16.5	V	
Backlight Power Consumption	WBL	--	600	--	mW	
LED life time	--	--	50000	--	Hrs	

Table 5.3.1 LED Backlight Characteristics

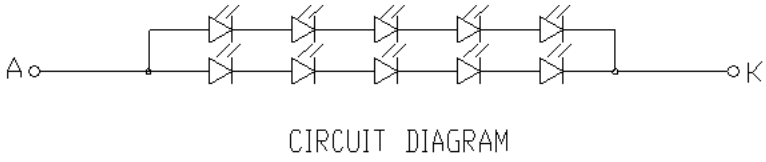


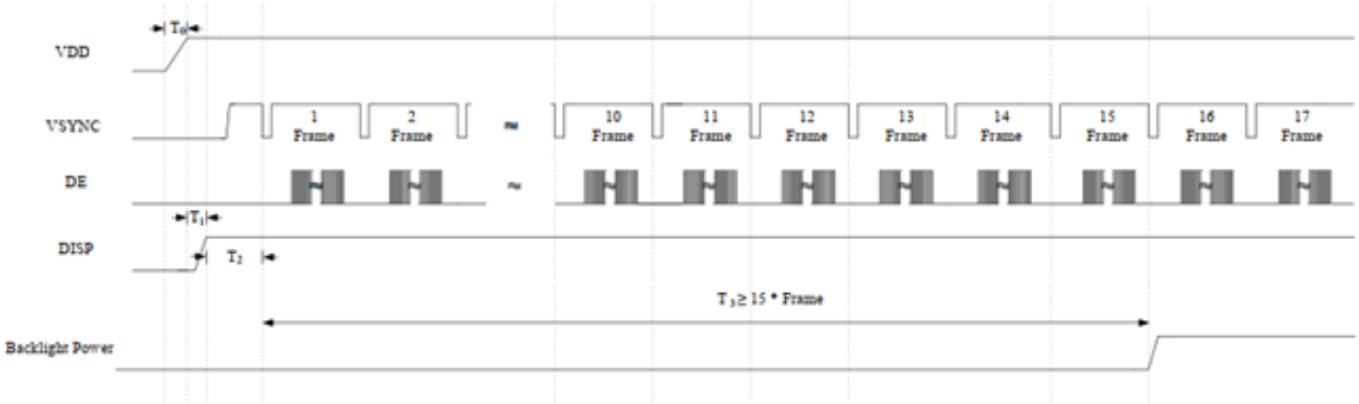
Figure 5.3.1 LED connection of backlight

Note1: There are a total of 2 LED channels in the backlight unit. While the LCM is operating, a stable forward current should be supplied.

Note2: Optical performance should be evaluated at Ta=25℃ only. If the LEDs are driven at high current or at high ambient temperature & high humidity environment, the lifetime of the LEDs will be reduced. Operating lifetime means the brightness will decrease to 50% of the original brightness.

5.4 Recommended Power ON/OFF Sequence

Power on Timing Sequence（for TFT）

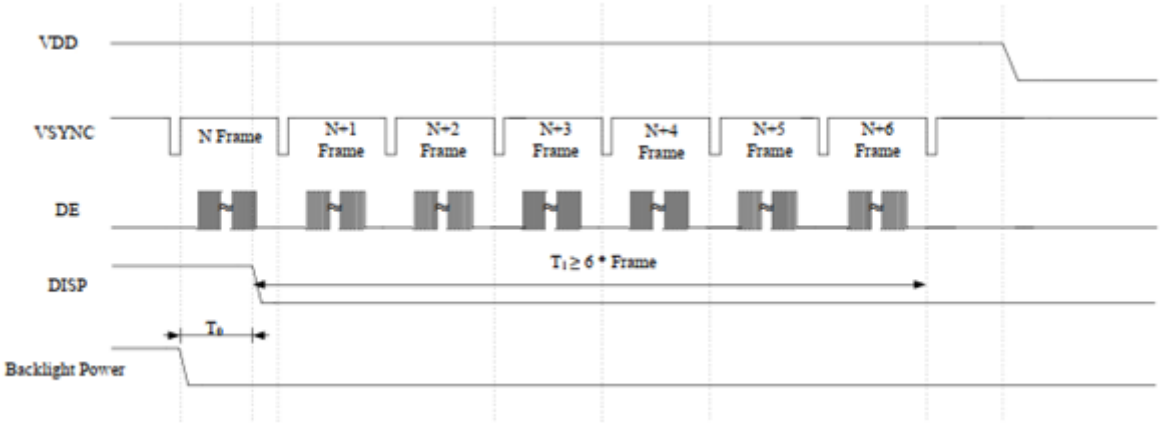


Item	Description	Min. Time	Max.Time	Unit
T0	VDD power source slew time	/	20	ms
T1	VDD= “High” to DISP=”High”	0	/	ms
T2	Time from DISP=”High” to the first VSYNC	0	/	ms
T3	Display Signal output to Backlight Power on	15*FR	/	ms

Table 5.4.1 Timing Diagram of Power on Sequence

Note1: FR=16.6ms (Typ)

Power off to Power on Sequence（for TFT）

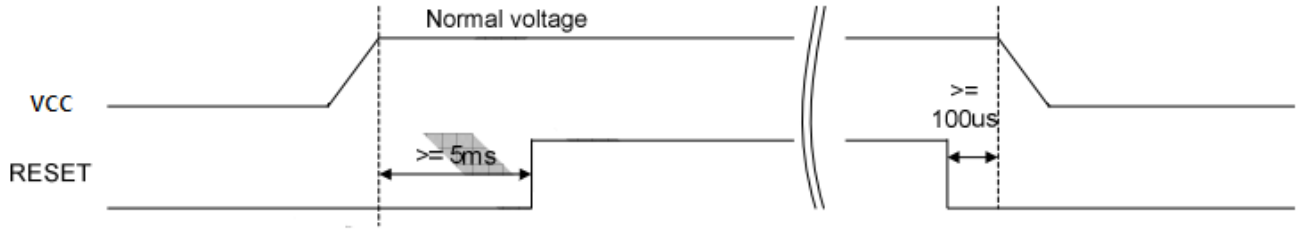


Item	Description	Min. Time	Unit
T0	Time from backlight power off to DISP=”L”.	5	ms
T1	Time from DISP=”L” to LCM Power off.	6*FR	ms

Table 5.4.2 Timing Diagram of Power off to Power on Sequence

Note1: FR=16.6ms (Typ)

Power On/off Sequence for CTP



Note1: RESET pin should be held low before power on and power off. During power on, after VCC reach normal voltage, RESET pin needs to be held low for 5ms to ensure internal block stable.

5.5 LCD Module Block Diagram

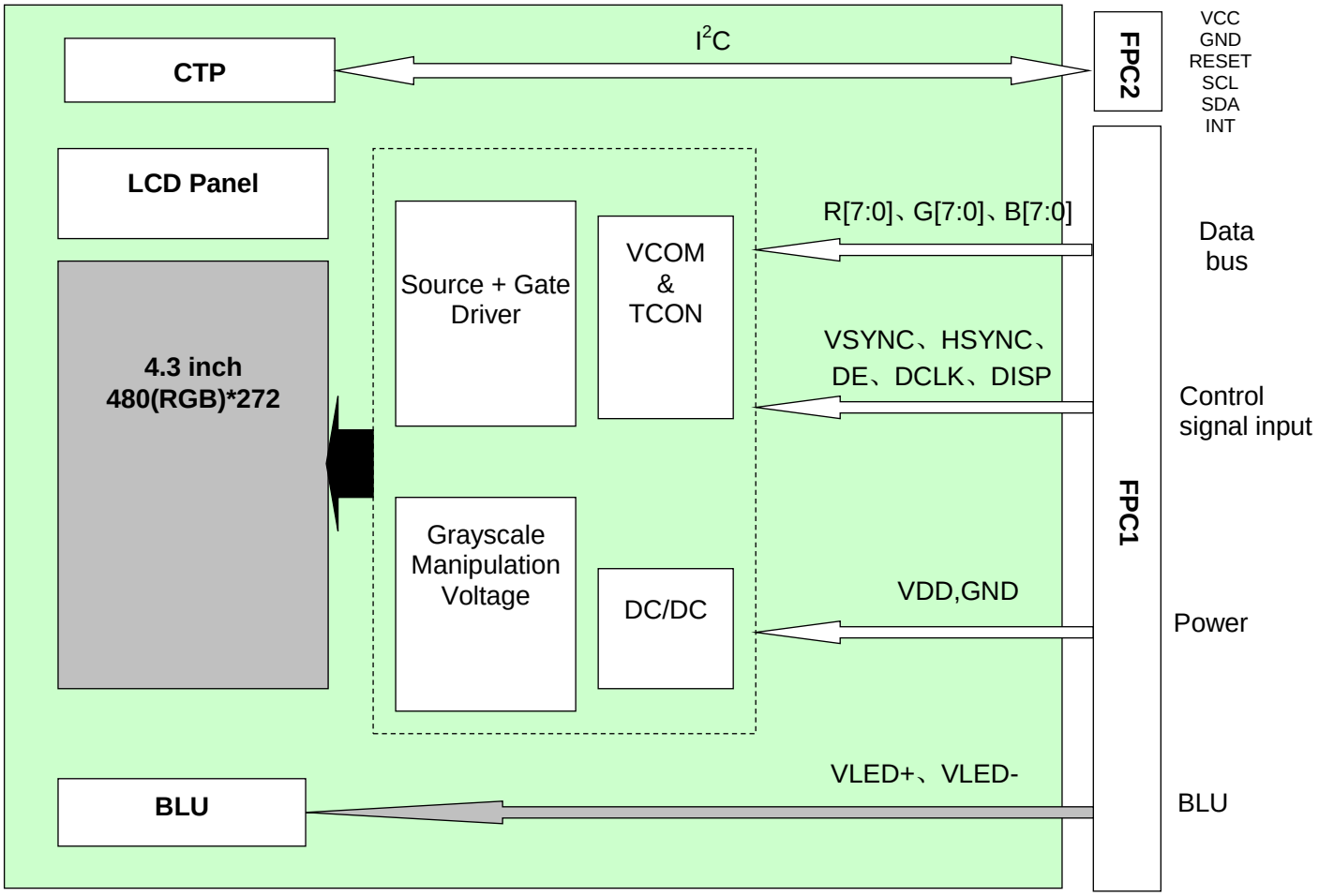


Figure 5.5.1 LCD Module Block Diagram

6. Timing Characteristics

6.1 AC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remark
DCLK Pulse Duty	T_{pd}	40%	50%	60%	ns	
DE Setup Time	T_{dest}	12	-	-	ns	
DE Hold Time	T_{dehd}	12	-	-	ns	
HSYNC Setup Time	T_{hst}	12	-	-	ns	
HSYNC Hold Time	T_{hhd}	12	-	-	ns	
VSYNC Setup Time	T_{vst}	12	-	-	ns	
VSYNC Hold Time	T_{vhd}	12	-	-	ns	
Data Setup Time	T_{dsu}	12	-	-	ns	
Data Hold Time	T_{dhd}	12	-	-	ns	

Table 6.1.1 Input Setup Timing Parameters Requirement

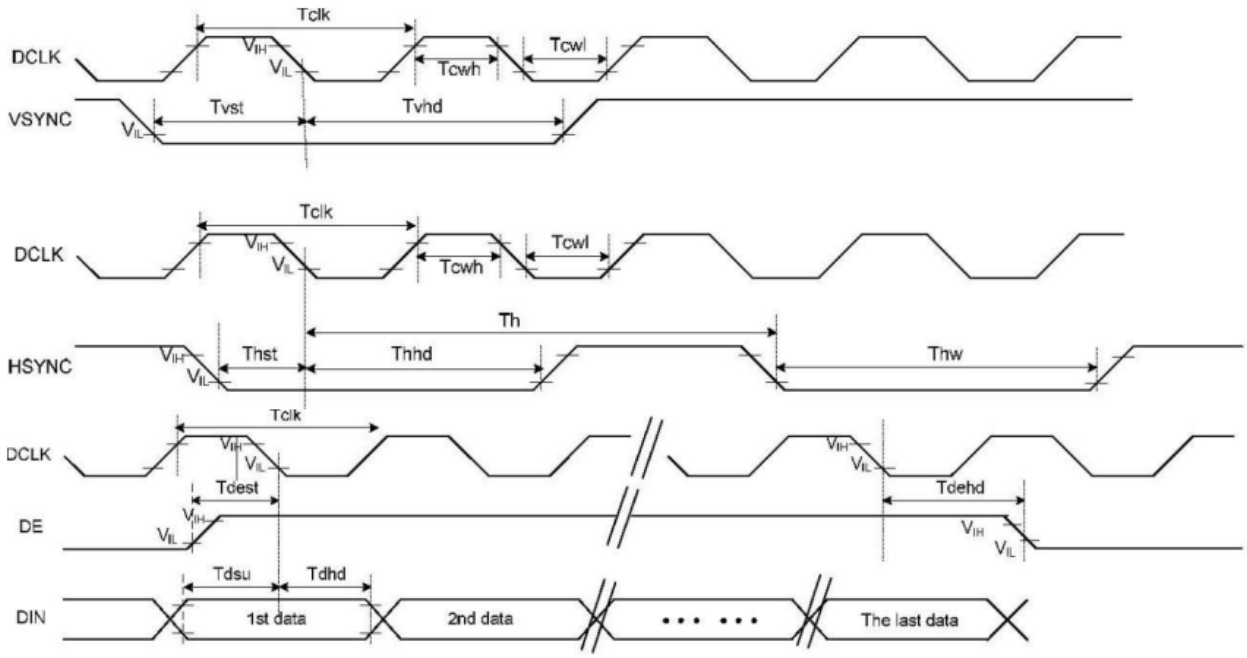


Figure 6.1.1 Clock and Data Input Timing Diagram

Note1: DIN include R[7:0] G[7:0] B[7:0].

6.2 Parallel 24-bit RGB Input Timing Table

Item		Symbol	Min	Typ	Max	Unit	Remark
DCLK Frequency		Fclk	8.6	9.3	10.6	MHz	
DCLK Period		Tclk	94	111	116	ns	
Line Period		Tlp	48	--	--	us	
Horizontal	Period Time	Th	510	531	561	DCLK	
	Display Period	Thdisp	480			DCLK	
	Back Porch	Thbp	26	43	69	DCLK	
	Front Porch	Thfp	4	8	12	DCLK	
	Pulse Width	Thw	2	4	6	DCLK	
Vertical	Period Time	Tv	282	292	316	HSYNC	
	Display Period	Tvdisp	272			HSYNC	
	Back Porch	Tvbp	6	12	30	HSYNC	
	Front Porch	Tvfp	4	8	14	HSYNC	
	Pulse Width	Tvw	2	4	7	HSYNC	
Frame Rate		FR	--	60	--	HZ	

Table 6.2.1 RGB input timing table

Note 1. It is necessary to keep Tvbp =12, Tvfp = 8, Tvw = 4 and Thbp = 43, Thfp = 8 Thw = 4 in sync mode.
Note 2. The Max Value and Min Value of porch must satisfy the range of Frame Rate and Line Period
Note 3. It is necessary to keep Thbp>10, Tvbp+Tvfp<128

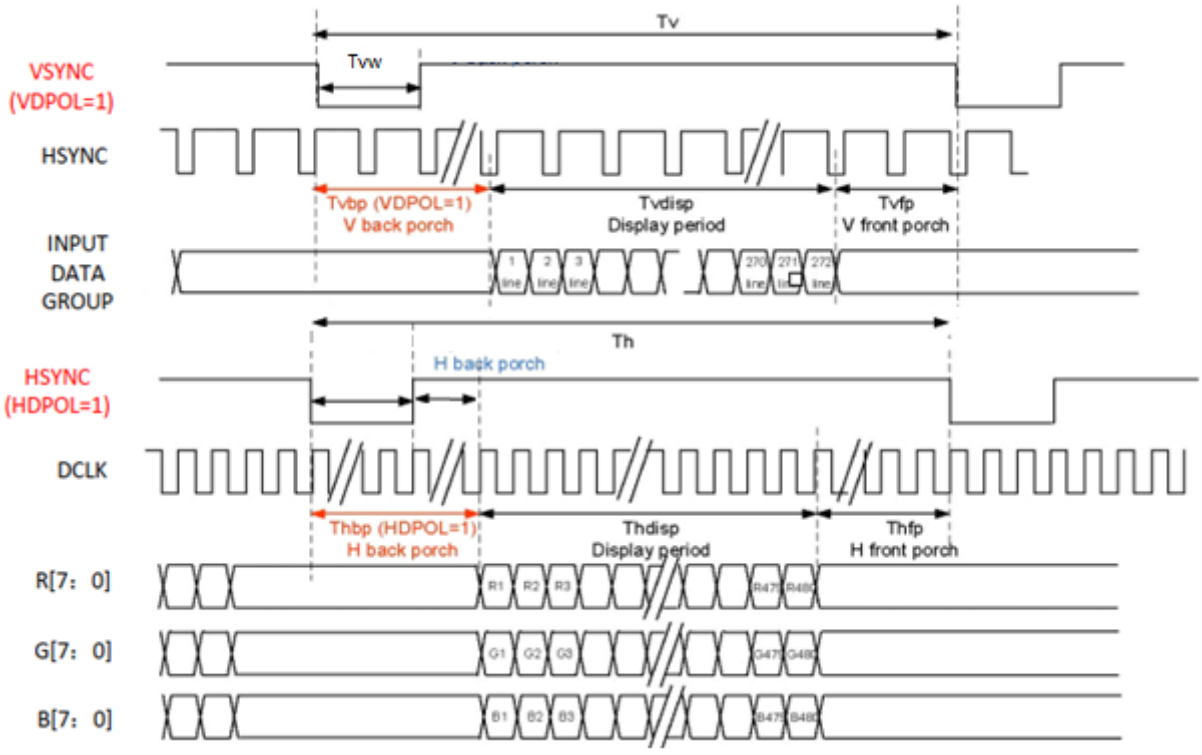


Figure 6.2.1 SYNC Mode Timing Diagram

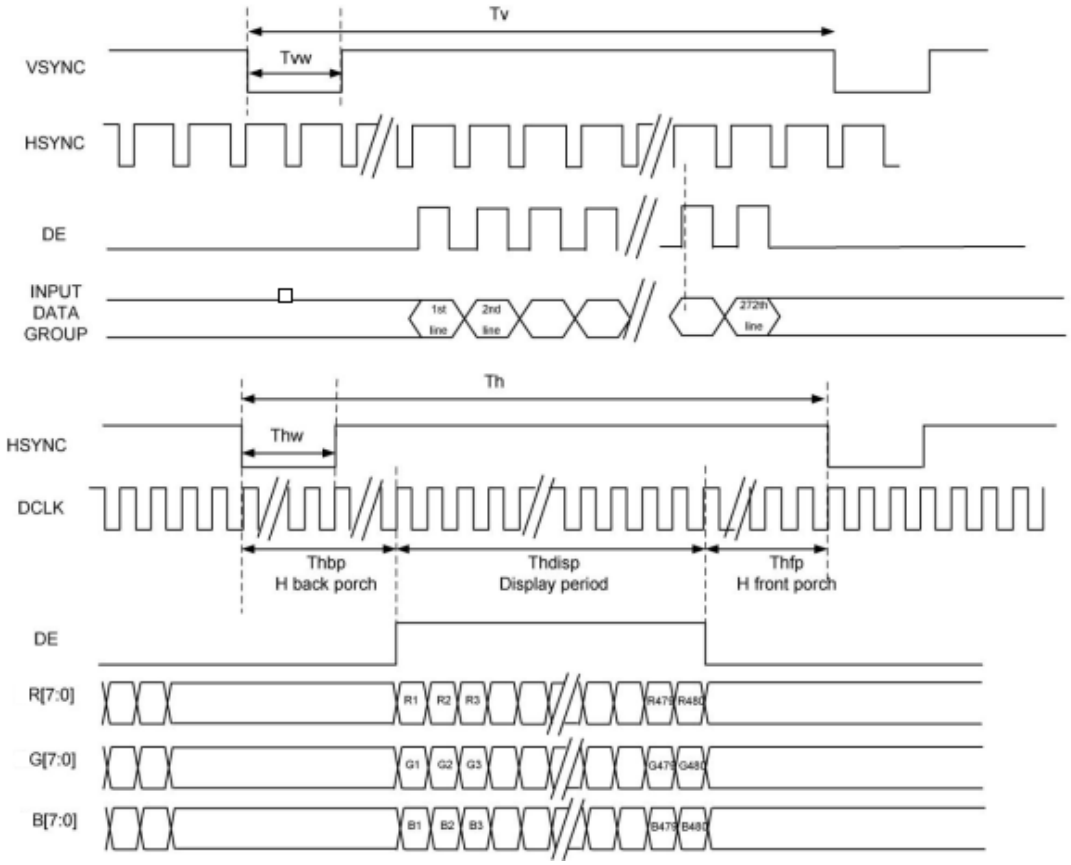
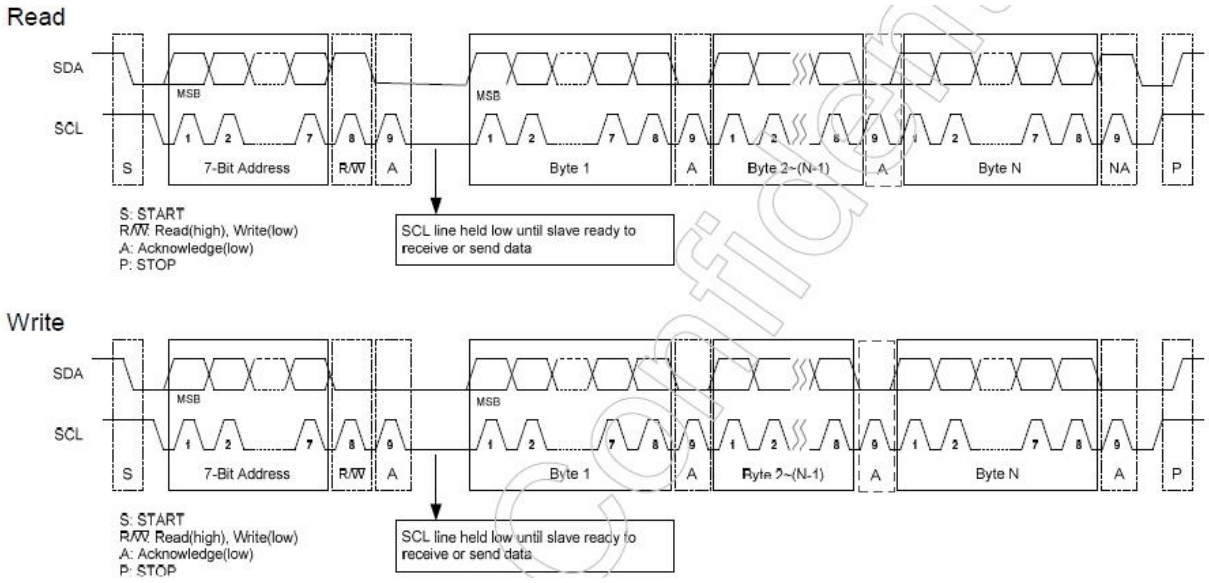


Figure 6.2.3 SYNC-DE Mode Timing Diagram

6.3 Timing Characteristics for CTP

The CTP IC equipped with I2C provides two wires, serial data (SDA) and serial clock (SCL), to carry transferring information at up to 400 kbit/s(Fast mode). CTP IC plays the slave role in I2C transfer. Both SDA and SCL are bidirectional lines, connected to VCC via pull-up resistors. All transactions begin with a START (S) and can be terminated by a STOP (P). 7-bits address follows START to recognize device. Each bye is 8-bits length and followed by an acknowledge bit. A HIGH to LOW transition on the SDA line while SCL is HIGH defines a START condition. A LOW to HIGH transition on the SDA line while SCL is HIGH defines a STOP condition. The data on the SDA line must be stable during the HIGH period of the clock. The HIGH or LOW state of the data line can only change when the clock signal on the SCL line is LOW.



Note1 : TP firmware needs to be adjusted after the whole machine assembly. If the client machine parts (including software) any changes, need to inform tianma assess whether to need to adjust the CTP firmware.

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	78	88	--	degree	Note2,3
		θB		78	88	--		
		θL		78	88	--		
		θR		78	88	--		
Contrast Ratio		CR	θ=0°	600	800	--		Note 3
Response Time		T_{ON}	25℃	--	25	35	ms	Note 4
		T_{OFF}						
Chromaticity	**White**	x	Backlight is on	0.264	0.314	0.364		Note 1,5
		y		0.287	0.337	0.387		
	Red	x		0.544	0.594	0.644		Note 1,5
		y		0.307	0.357	0.407		
	Green	x		0.294	0.344	0.394		Note 1,5
		y		0.536	0.586	0.676		
	Blue	x		0.103	0.153	0.203		Note 1,5
		y		0.049	0.099	0.149		
Uniformity		U		75	80	--	%	Note 6
NTSC		-		45	50	--	%	Note 5
Luminance(with CTP)		L		300	350	--	cd/m^2	Note 7

Table 7.1 Optical Parameters

Test Conditions:

1. IF= 40 mA, and the ambient temperature is 25℃.
2. The test systems refer to Note1 and Note2.

Note1: Definition of optical measurement system.

Note2: Definition of viewing angle range and measurement system. Viewing angle is measured at the center point of the LCD.

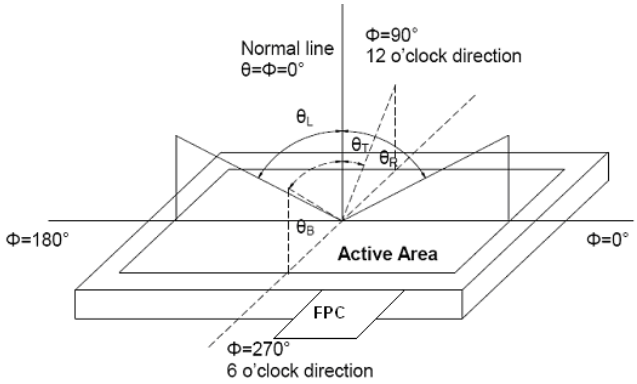


Fig1. Measurement viewing angle

Note3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

Note4: The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (Tr) is the time between photo detector output intensity changed from 10% to 90%. And fall time (Tf) is the time between photo detector output intensity changed from 90% to 10%.

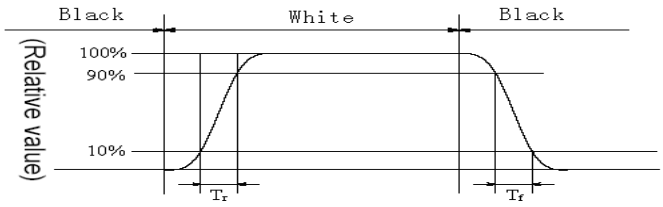


Fig2.Response Time Testing

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Contrast ratio against temperature

CR defines the allowed contrast reduction at the defined temperature based on the CR at room temperature.

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig.5). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

L-------Active area length; W----- Active area width

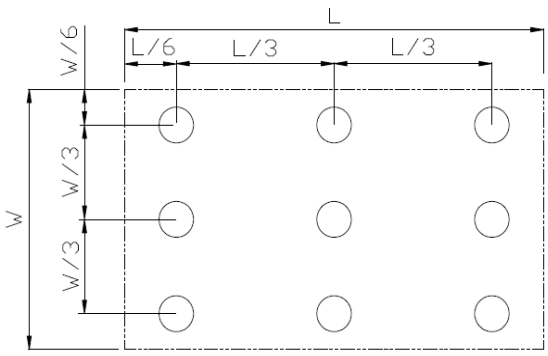


Fig3. Luminance Uniformity Measurement Locations(9 points)

Note8: Definition of Luminance:

Measure the luminance of white state at center point.

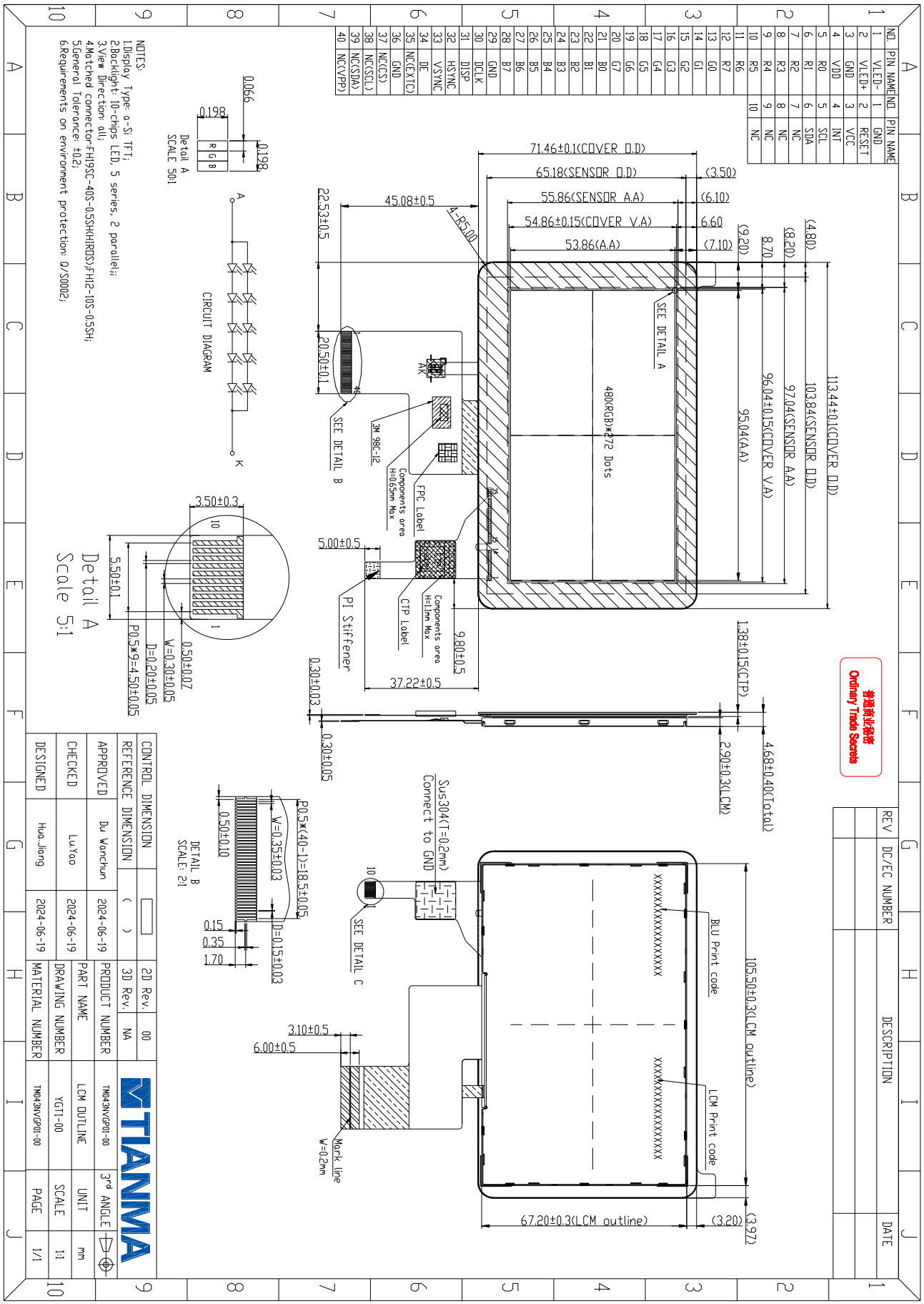
8. Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ta=+70℃，240 hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta=-20℃，240 hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta=+80℃，240 hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta=-30℃，240 hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity(non-operation)	60℃, 90%RH 240H non-operation	IEC60068-2-78 :2001 GB/T 2423.3-2016
6	Thermal Shock (non-operation)	-30℃ 30min ~+80℃ 30min， Change time：5min， 20 cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984, GB/T 2423.22-2012
7	ESD	C=150pF,R=330Ω, 5 point/panel, Air: ±8KV, 5 times; Contact ±4KV,5times	IEC61000-4-2:2001 GB/T 17626.2-2018
8	Vibration Test (non-operation)	Frequency range:10~55Hz Sroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z(6 hours for total)	IEC60068-2-6:1982 GB/T 2423.10-2019
9	Mechanical Shock (non-operation)	Half Sine Wave 60G, 6ms, ±X, ±Y, ±Z 3times for each direction	IEC60068-2-27:1987 GB/T 2423.5-2019
10	Package Vibration	5-20-200HZ, PSD: 0.01-0.01-0.001 Total: 0.781g2/HZ, x/y/z every direction 30min）	GB/T 4857.23-2021
11	Package Drop Test	Height: 60 cm,1 corner, 3edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Table 8.1 RA test condition

Note1: Temperature is the ambient temperature of sample
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product's function only be guaranteed, but not for all of the cosmetic specification.

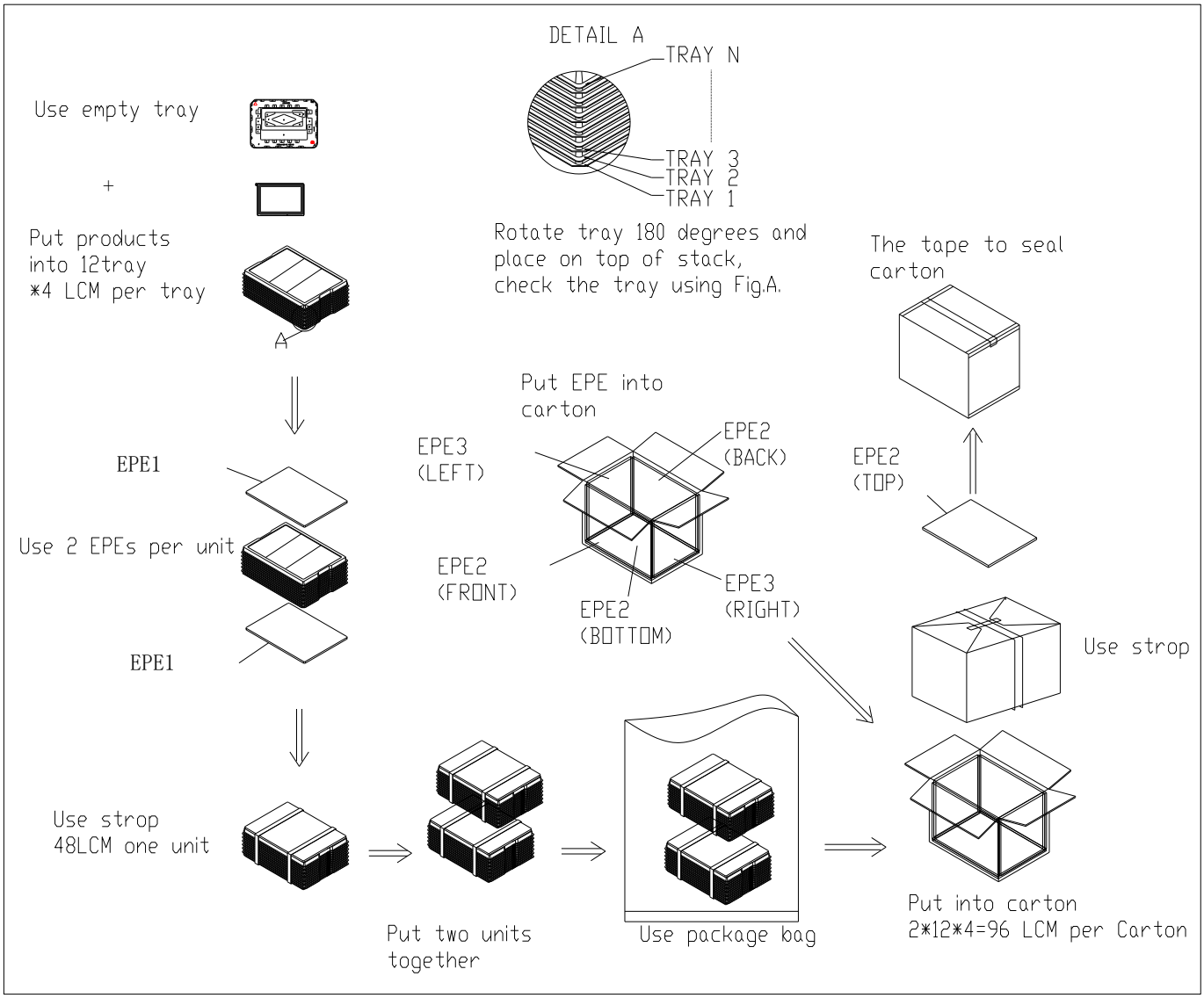
9. Mechanical Drawing



10. Packing Instruction

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	P0430WQF1ME00DK00	113.44×71.46×4.68	0.07	96	
2	Tray	PET	356×256×14.5	0.098	26	
3	EPE1	EPE	336×246×6	0.01	4	
4	EPE2	EPE	375×275×10	0.014	4	
5	EPE3	EPE	250×280×12	0.015	2	
6	Carton	Corrugated Paper	398×290×315	0.75	1	
7	Package bag	PE	680×520	0.042	1	
8	Lable	Paper	100×52	0.001	1	
9	Total weight	10.187Kg±10%				

Table 10.1 Packing instruction



11. Precautions for Use of LCD Modules

11.1 Handling Precautions

(1) The display panel is made of glass. Do not subject it to mechanical shock by dropping it, etc.
(2) If the display panel is damaged and the liquid crystal fluid inside it leaks out be sure not to get any in your mouth. If the fluid comes into contact with your skin or clothes promptly wash it off using soap and water.
(3) Do not apply excessive force to the display surface or the bezel since this may cause the color tone to vary.
(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle the polarizer carefully.
(5) If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is still not completely clear use a moist cloth with one of the following solvents:
- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Specifically, do not use the following:
- Water
- Ketone
- Aromatic solvents

(6) Do not disassemble the LCD Module.
(7) If powered off, do not apply the input signals.
(8) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
(9) Be sure to ground your body when handling the LCD Modules.
(10) Tools used for assembly, must be properly grounded.
(11) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
(12) The LCD Module is covered with a film to protect the display surface, remove film slowly under the ionizer.

11.2 Storage precautions

(1) When storing the LCD modules avoid exposure to direct sunlight or to the light of fluorescent lamps.
(2) The LCD modules should be stored within the rated storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is: Temperature: 0 ~ 35 ℃ at normal humidity.
(3) The LCD modules should be stored in a room without acid, alkali or other harmful gas.

11.3 Transportation Precautions

The LCD modules should not be dropped or subject to violent mechanical shock during transportation. Also they should avoid excessive pressure, water, high humidity and direct sunlight.

11.4 Screen saver Precautions

Not display the fixed pattern for a long time. Use a screen saver, if the fixed pattern is displayed on the screen

11.5 Safety Precautions

(1) When you waste damaged or unnecessary LCDs, it is recommended to crush LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned
(2) Be sure to turn off the power supply when inserting or disconnecting the LED backlight cable.
(3) LED driver should be designed carefully to limit or stop its function when over current is detected on the LED.